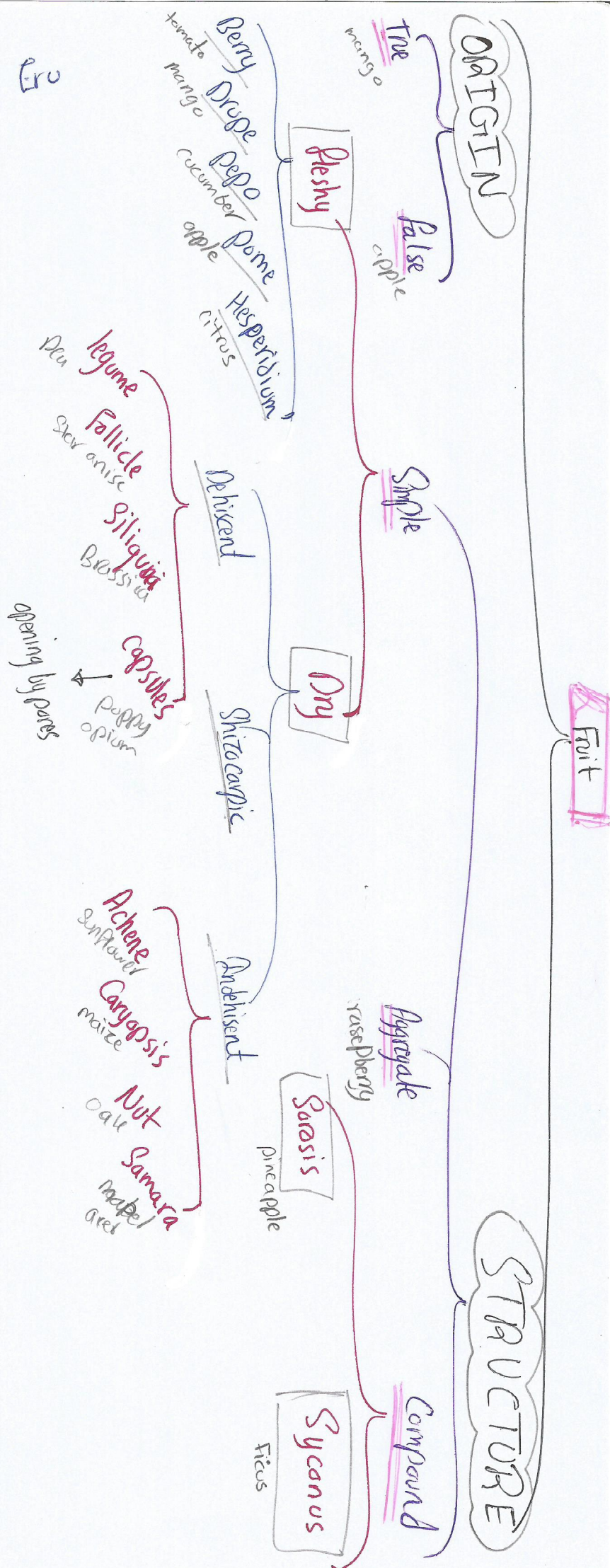


Fruit

①

Spark Eru



Fruit Defined as a Fertilized and developed ovary

- * Parthenocarpy is phenomenon of development of fruit without fertilization
- * Parthenocarpic fruit is seedless fruits developed without fertilization

Structure of Fruit

- * Pericarp consists of three layers - outer epicarp (exocarp), middle mesocarp and inner endocarp

Classification of Fruit

* According to origin
(True - False)

* According to Structure
(Simple - Aggregate - compound)

I) According to origin

- A) True Fruit is from ovary (Mango, Banana, Tomato)
- B) False Fruit / Pseudo Fruit is derived from ovary with other floral parts (Apple)

II) According to structure

- A) Simple Fruits is the ovary may be monocarpellary or multicarpellary syncarpous (several carpels fused together)

Simple Fruits has two types is

I Fleshy / Juicy Fruits

1 <u>Berry</u> All part of the seed including the epicarp is edible eg Tomato	2 <u>Drupe = stonefruit</u> because of stony hard endo carp Fleshy mesocarp is the edible part eg Mango	3 <u>Hesperidium</u> Contain a middle fibrous mesocarp the edible part is the endo carp eg Citrus	4 <u>Pepo</u> tricarpeallary, syncarpous inferior ovary the whole seed is edible eg Melon, Cucumber	5 <u>Pome</u> Fleshy and False Fruit the edible part is the fleshy thalamus eg Apple, Pear
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II Dry Fruits

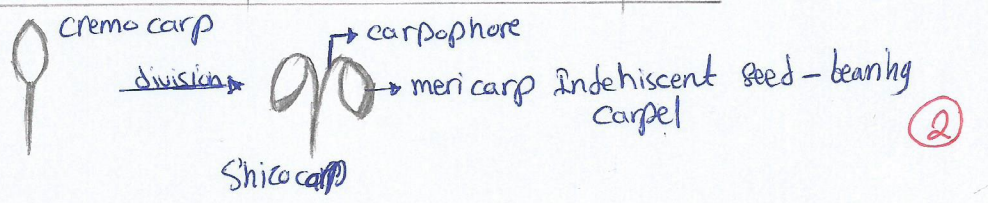
is the fruit have dry pericarp, divided into three types is

Dehiscent is upon ripping it splits to liberate the seed. divided according to num of splits

1 <u>legume</u> Divided into two valves eg Pea legume dehiscent dry fleshy simple fruit	2 <u>Follicle</u> Dehices from one structure only eg Star anise	3 <u>Silique</u> Large number of seeds remains attached to the false septum called <u>replum</u> eg Brassica Black and white mustard	4 <u>Capsule</u> opened by different types * opening by pores as in a poppy eg opium
--	---	---	--

Schizocarpic dry Fruits

eg F. Umbelliferae
(Figure pg 79)



3] Indehiscent dry fruits & pericarp does not split, classified to

① Achene

Seed attached to the fruit at one point

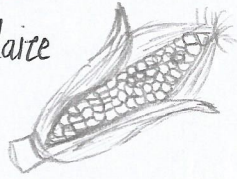
egⁿ Sunflower



② Caryopsis (grain)

Seed is firmly attached to the fruit at all possible points

egⁿ Maize



③ Nut

develop from di or multicarpellary . become hard at maturity

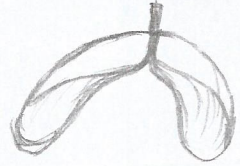
egⁿ Oak



④ Samara

A winged achene the wing is modified outgrowth of pericarp

egⁿ Acer (maple)



13] Aggregate fruits Develops from a single flower with multicarpellary ovaries
An aggregate fruit consists of a collection of simple fruits
egⁿ Raspberry fruit.



14] Multiple or Composite fruit or compound fruit Develops from a whole inflorescence forming one body at maturity

① Sorosis

Develops from spike inflorescence

egⁿ Pineapple

② Syconus

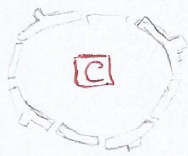
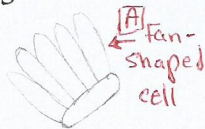
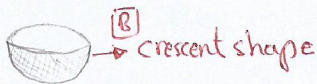
Derived from inflorescence known as Hypanthodium which has fleshy receptacle
egⁿ Ficus

Ami Visnaga

- Slightly aromatic odor
- Bitter taste
- Smaller in size
- darker in color (violet tinge)

Microscopical character

- 1) Epicarp typically pentagonal with no hairs
The outer surface contain 5 1° ridges and 4 prominent secondary ridges
- 2) Mesocarp contain ^[A] vittae in the 2° ridges
Surrounded by fan-shaped cells ^[B], 5 vascular bundles forming crescent shape around empty vittae (lacuna) ^[C]. Inner most layer contain porous wall (porous layer)



- 3) Indistinct parquetry endocarp

Key element

- * parquetry endocarp accompanied by vittae accompanied by porous layer



Active constituent

- 1) Bitter principle → Furanochromons (khellin & visnagin)
rose red color ← pellet of KOH + heat

Uses

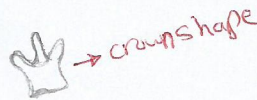
- 1) Spasmolytic of bronchi & GIT;
- 2) Relax muscle of ureter → remove small bladder & kidney stones. ← khellin
- 3) Whooping cough.

Ami majus

- slightly aromatic odor
- Bitter taste
- larger in size
- lighter in color (no violet tinge)

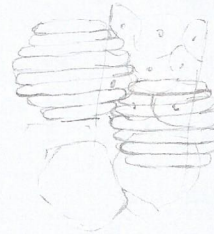
Microscopical character

- 1) Epicarp typically pentagonal with no hairs
The outer surface is marked with 5 distinct primary ridges and 4 more prominent 2° ridges
- 2) Mesocarp contain ^[A] vittae surrounded by fan shaped-cells ^[B], 5 vascular bundles forming crown shape ^[C]. Inner most layer have thick non porous inner walls
- 3) Parquetry endocarp.



Key element

- parquetry endocarp accompanied by vittae transversed by non porous layer



Active constituent

- 1) Bitter principle → Furanocoumarins (psoralene, Xanthotoxin, ammodiols)

Uses

- 1) psoralene stimulate pigment in skin exposed to U.V light.
- 2) treatment of Vitiligo & alopecia

Chemical test

- Alcoholic extract of fruit give blue fluorescence in U.V light due to Furanocoumarins content.

7 Coriander Fruits

*

Dried ripe fruit of *Coriandrum Sativum* F. Umbelliferae.

The unripe fruit has strong disagreeable odour but the ripe has aromatic odour

taste is aromatic spicy characteristic

odour is aromatic characteristic

Microscopical characters

The outer line contains 5 wavy primary ridges and 4 more prominent straight secondary ridges

1) Epicarp

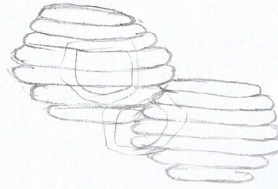
Hemispherical and contains no hairs

2) Mesocarp

is formed of tangentially and longitudinally elongated parenchymatous cells

The middle zone contains fusiform fibres of sclerenchyma

The innermost layer consists of porous cells



3) Pericarp endocarp

Active constituents

volatile oil linalool, anethol, camphore.

Uses

1) spice

2) stomachic, spasmolytic, carminative

3) Flavouring agent

Chemical tests

Flavoglucenol + HCl $\longrightarrow$ red

1] Fennel

Dried ripe fruit of *Foeniculum*

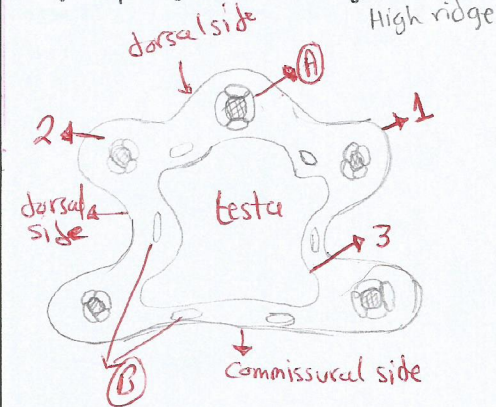
Vulgare F. Umbelliferous

Shape: Oval Oblong
Color: yellowish green
Taste: Sweet
Odor: aromatic

Microscopical character

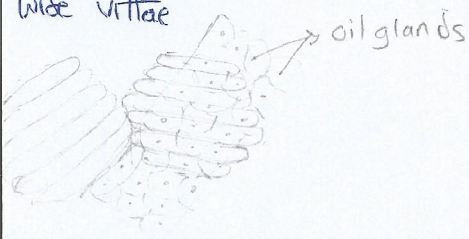
- 1) Epicarp without hair
- 2) Mesocarp contain ^A5 bicollateral vascular bundles accompanied by upper and lower reticulate parenchyma. ^B6 brown vittae 6 in dorsal side and 2 in commissural side

3) Parquetry Endocarp



Key Elements

Parquetry Endocarp accompanied by wide vittae



Active Constituent

V.O :: trans-anethole and Fenchone

Uses

- 1) Secretolytic action in respiratory tract
- 2) Breast-milk production (lactagogue)
- 3) Carminative

2] Anise

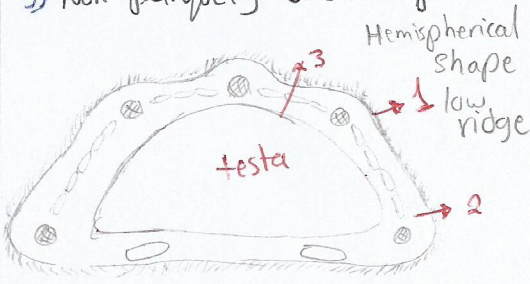
Dried ripe fruit of *Pimpinella*

anisum F. Umbelliferous

Shape: Pear-shaped
Color: greenish brown
Taste: Sweet
Odor: Strong aromatic

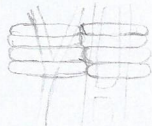
Microscopical character

- 1) Epicarp with stiff hair
- 2) Mesocarp contain 5 bicollateral vascular bundles and many vittae
- 3) Non-parquetry Endocarp



Key Elements

No Parquetry Endocarp accompanied by vittae



Non-glandular uni or bi seriate conicle, slightly curved with warty cuticle.

Active constituents

1) Volatile oil → trans-anethole

Uses

- 1) Carminative
- 2) Secretolytic action
- 3) For hard dry cough and whooping cough

3] Fructus conii (Hemlock)

Dried unripe fruit of *Conium*

maculatum F. Umbelliferous

Adulterant of Anise
Poisonous plant

Microscopical character

- 1) No hair
- 2) No vittae

Active constituents

1) Liquid alkaloid called conine in the endocarp
Poisonous

Chemical test

On treatment with soln of KOH gives strong mouse like odor due to liberation of conine.
Mayer → +ve (alkaloids)

Uses

- 1) Very small doses for convulsion diseases and epilepsy

✗ if use in large doses
Conine → depresses the motor nerve endings → respiratory paralysis → Death.

4] Star anise F. magnoliaceae

Active constituents

- 1) trans-anethole ← V.O
- 2) Shikimic acid → primary precursor in the pharmaceutical synthesis of anti-influenza drugs (Tamiflu)

8 Capsicum

Dried ripe fruits of *Capsicum minimum*

* F. Solanaceae

- 1) orange red color
- 2) coiled embryo
- 3) pungent taste and odour

Microscopical characters

- 1) Mesocarp contain thin walled giant cells
- 2) Endocarp contain 1) isodiametric sclereides with thick wide lumen slightly lignified



- 3) Seed coat contain 1) Sclereides with wavy narrow lumen strongly lignified



Active constituent and chemical test

- 1) Pungent phenolic principle $\Rightarrow$ Capsaicin
 - ① gives bluish green with $FeCl_3$
 - ② conc H_2SO_4 + sucrose $\rightarrow$ violet color
- 2) Non-pungent liquid alkaloid

Uses

- 1) Spice
- 2) dyspepsia and flatulence
- 3) in plasters & ointments as counter irritant to relief lumbago and rheumatism
 ↓
 lower back pain

9 Senna

Dried ripe fruit of *Cassia acutifolia* & *Cassia angustifolia* ~~≠~~
 containing anthraquinone glycoside

Active constituent

- 1) Anthraquinone $\Rightarrow$ Sennoside A & B glycosides
 Sennoside C & D
- 2) Anthrone $\Rightarrow$ rhein, aloë-emodin

Uses

$\rightarrow$ laxative, it stimulates the muscular coat of the intestine and produce purgation

Chemical test

- 1) Borntrager test for anthrone
- 2) Modified Borntrager test for dianthrone
 (alc KOH, ether, NaOH)

Alexandrian Senna pod powder

Contain, crystal sheath

- 2) unicellular non-glandular hair covered with warty cuticle

10 Colocynth Fruit $\leftarrow$ Bitter apple, Bitter cucumber

* Dried pulp of fully grown but unripe fruit
 $\rightarrow$ no seeds or outer hard pericarp

Active constituent & uses

Triterpenes $\Rightarrow$ Cucurbitacin E $\rightarrow$ anti oxidant
 anti bacterial & anti fungal & anti tumor
 Hepato protective • In diabetic hyperlipidemia ↓

Resin $\rightarrow$ purgative effect

used for abortion

Chemical tests

powder + 80% H_2SO_4 $\rightarrow$ red color due to
Cucurbitacin E

11) Black Pepper

Dried fully grown ~~unripe~~ fruits of
Piper nigrum F. Piperaceae

Active constituents

Volatile oil

Pungent alkaloid (piperine)

Uses

Spice condiment, Stomachic

12) Milk Thistle

Active constituent

Flavonolignan $\rightarrow$ Silybin & Silymarin

Uses

1) Regeneration of liver cells in case of
alcoholic liver cirrhosis

2) protect liver from toxins

3) treatment of liver diseases

13) Hawthorn berry

^{Uses}
~~Active constituent~~

for cardiac insufficiency

Heart and circulatory disturbance

Hypotension and arteriosclerosis

Active constituents

procyanidins & Flavonoids

Black Mustard

Dried ripe seed of *Brassica nigra* Family
Cruciferae

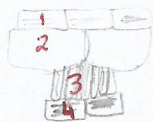
Seed exalbuminous
ovules campylo-triplose
Embryo Orthoplocous

Odor odorless when dry, pungent when wet

Color Black

Shape spherical

Taste strongly pungent



Microscopical characters

Outer integument

- ① Epidermis → parenchymatous cells
- ② Hypodermis → one row of thin walled giant cells
- ③ Scleride layer → palisade layer of unequal length

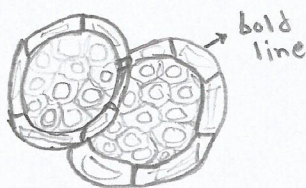
Inner Integument

- ④ Hyaline layer of parenchyma cells contain coloring matter

ret work reticulation

Key element

Net work reticulation



Active constituent

- 1) Thioglycoside (sulphur containing glycoside) called **sinigrin** $\xrightarrow[\text{myrosin enzyme}]{\text{Hydrolysis}}$ (allyl isothiocyanate) + dextrose + potassium acid sulphate

volatile liquid with pungent taste and odor

Uses

- 1) Rubefacient and counterirritant for rheumatic pains
- 2) Aids Chilblains (by sprinkling into a bath. → stimulation of circulation)

Chemical test

NaOH
-ve
Millon's reagent
-ve

White Mustard

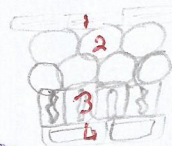
Dried ripe seed of *Brassica Alba* Family
Cruciferae

Odor odorless when dry & wet

Color yellow

Shape nearly spherical

Taste pungent



Microscopical characters

Outer integument

- ① Epidermal → parenchymatous cells
- ② Hypodermis → 2 layers of collenchymatous cells
- ③ Palisade layer → equal length

Inner Integument

- ④ Hyaline layer of parenchyma cell devoid of coloring matter

Key element

Sclerocymatous layer



Active constituent

- 2) Thioglycoside called **sinalbin** $\xrightarrow[\text{Myrosin Enzyme}]{\text{Hydrolysis (H}_2\text{O)}}$ acrylyl isothiocyanate + glucose + potassium Sinapine sulphate

yellow liquid with pungent taste only

Uses

- 1) Rubefacient and counterirritant
mask the original pain
- 2) Stimulates circulation

vasodilatation

NaOH

intense yellow due to K sinapine Sou

red color